

The Bioeconomy Consultants

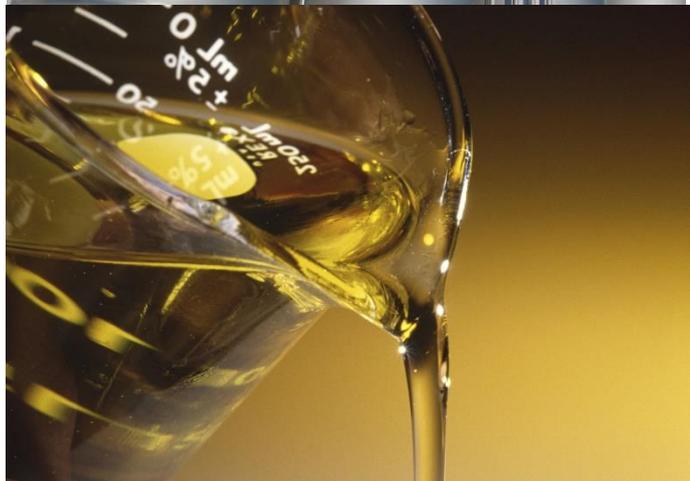
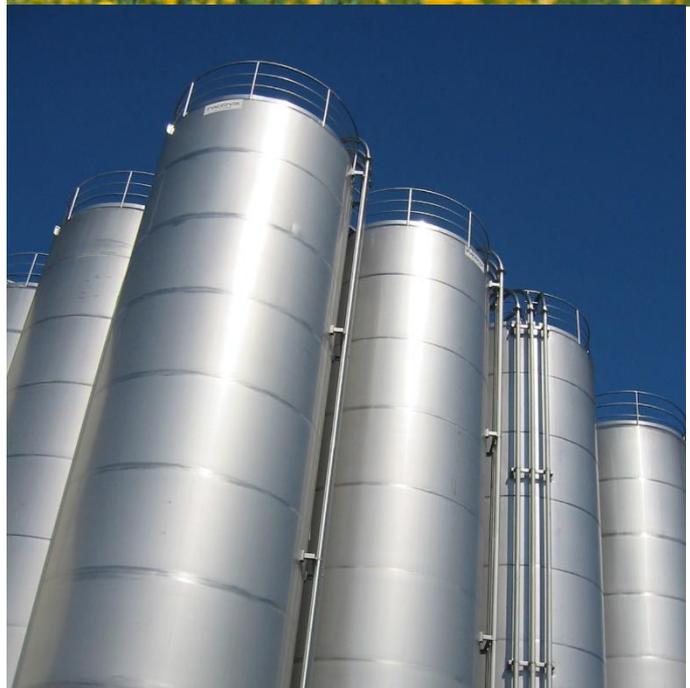


## News Review

Issue Sixty-Seven

October 2017

**Each month we review the latest news and select key announcements and commentary from across the biofuels sector.**



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# Foreword

Welcome to October's final free News Review, which is, of course, biofuels.

The big news in renewable transport (but not necessarily biofuels) this month has been the announcement by the Dutch government to ban the sale of any vehicles with internal combustion engines by 2025. This is obviously great news for the Netherlands' transport emissions, but bad news for biofuels. Many countries are going for a similar approach, tailoring their transport policies in order to transition fully to electric cars in the future, but in the meantime, biofuels can provide an immediate and cost-effective way to decarbonise transport fuel during that transitional period. This is reflected in policies such as the UK's RTFO and the USA's RFS. Both see the importance of low carbon biofuels even though the UK has mooted a ban on conventional petrol- and diesel-powered cars by 2040.

But one area where biofuels could provide the most sustainable solution for years to come is in jet fuels. Currently no technology has been developed to allow large scale electric planes, and so biofuels present the only viable alternative to fossil-based jet fuels. There is good news on this front from the past month, with the announcement that the Qantas airline will be powering all its Los Angeles-based flights with biofuel from 2020. Even more exciting is the level of biofuel mix they intend to use, opting for a 50% biofuel blend, which is higher than any used by a commercial flight as of yet. If this becomes a success, then hopefully other airlines will begin to follow suit.

Closer to home, there is a very heart-warming story from the streets of Bristol, where GENeco have been using biogas produced from Anaerobic Digestion to power a truck that travels the city collecting food waste. The food waste collected is then fed back into GENeco's AD plant to generate biogas both for heating and power, but also to continue powering the truck. The truck is painted black and yellow and nicknamed the "Bio-Bee", and will hopefully raise awareness for biogas as transport fuel, and for more sustainable food waste disposal in general.

Read on for the latest news.

# Policy

## All Dutch cars to be zero-emissions by 2030

European countries continue to implement aggressive policies to move away from fossil fuels for transportation and favour zero-emission solutions in renewable energy and vehicles.

Last year, the Netherlands joined Norway to ban the sale of new cars powered by internal-combustion engines (ICE) after 2025.

The country will still allow ICE's on its roads after that year, but all new vehicles sold in 2025 will not contain combustion engines.

Now, the Dutch government has further honed its ban with a follow-up policy: all vehicles in the Netherlands must be zero-emission by 2030.

The NL Times recently reported on major changes planned by the new Dutch government, including its follow-up to the initial policy, spelled out within its agenda for "mobility and passenger transport" actions.

The move departs from the rules originally proposed, which said internal-combustion cars sold before 2025 would be grandfathered in to operate until the ends of their lives.

The original draft also gave a pass to hybrid vehicles that contained internal-combustion engines as part of their powertrains.

Back in the Netherlands, the new Dutch government said it plans to make 4 billion Euros available to continue its transition to renewable energies. It will also close all coal power plants by 2030.

Under the national climate agreement in place, the Dutch now plan to reduce the country's carbon emissions by 49 percent that same year.

Click [here](#) for more information.

## NBB defiant as EPA doesn't raise biofuel volumes

The National Biodiesel Board (NBB) has responded to the U.S. Environmental Protection Agency's (EPA) Notice of Data Availability (NODA), focusing on the advanced biofuel standard for 2018 and the 2019 volume for biomass-based diesel under the Renewable Fuel Standard (RFS). The EPA also released a letter providing assurances to a group of U.S. senators on different aspects of the RFS program. The letter did not commit to raising the 2019 biomass-based diesel volume higher than 2.1 billion gallons, as proposed.

Although NBB appreciates that further cuts won't be pursued, volumes higher than 2.1 billion gallons of biomass-based diesel are warranted and must be granted for the industry to continue to grow.

NBB submitted comments on the NODA, tackling head-on the myths being perpetrated about the biodiesel industry's ability to produce. The U.S. biomass-based diesel industry can generate 2.6 billion gallons right now and has the additional registered capacity to ramp up production even higher with sufficient continuing support from the RFS volumes. In other words, it is clear that domestic production alone could generate substantially more than the 2.1 billion-gallon volume in EPA's proposed rule.

The industry has routinely surpassed the annual biomass-based diesel volumes and currently comprises the vast majority of advanced biofuel production (roughly 93 percent). Unfortunately, EPA's proposal would halt the progress of the biomass-based diesel industry and thwart Congress's intent to increase advanced biofuel production. For the first time, the proposed rule lowers the advanced biofuel volume from the previous year and does not increase the biomass-based diesel volume.

Click [here](#) for more information.

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## Letter argues biofuel palm oil ban doesn't accomplish aims



*Pixabay*

Since plantations differ massively in environmental and social criteria, a general ban on use of palm oil in biofuels, as recently discussed by the European Union, would punish the wrong producers while having little impact on reducing deforestation, argues Jadbouy Ghazoul in Environmental Research letters to the Renewable Energy Journal.

Annually, the EU imports around seven million metric tonnes of palm oil from tropical countries, of which over 40% is used for biofuels.

In April 2017, the European Parliament voted to ban the use of palm oil in biofuels by 2020, ostensibly to limit the deforestation which has been blamed on the expansion of oil palm plantations. Norway has followed suit, with even tighter targets that ban the use of palm oil biofuels by public bodies by the end of 2017. The French environment minister has also pledged to stop "imported deforestation".

Many will welcome these policies, concerned as they are with the environmental damage attributed to palm oil production. Yet a simple ban ignores the complexity of issues that swirl around the oil palm debate. While environmental organizations have highlighted illegal and environmentally damaging activities by the oil palm industry in Southeast Asia, other palm oil producers risk being unfairly tarred with the same brush.

A more nuanced policy is required: one that rewards industries and countries that promote sustainable standards. The EU should therefore implement its ban selectively, discriminating among palm oil sources based on sustainability criteria. The EU's Renewable Energy Directive already provides a mechanism for such differentiation across all biofuel feedstocks. This mechanism needs improvement, as it does not yet take sufficient account of biodiversity and social issues, and instead focuses on greenhouse gas emissions. Greater investments in traceability from production through to consumption are also required.

Click [here](#) for more information.

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## Markets

### UK's 2016 waste-derived fuel exports expected to exceed 3m tonnes

Exports of waste derived fuels from England in 2016 look to have exceeded 3 million tonnes, latest Environment Agency figures indicate. According to provisional Agency data released for January to November 2016, a total of 2,884,866 tonnes of waste derived fuel was approved for export – roughly 262,000 tonnes per month

The feedstock material predominantly consists of refuse-derived fuel (RDF), but a growing amount of solid recovered fuel (SRF) has also been highlighted by the Agency in its monthly figures.

The total already puts export tonnages ahead of the final figure for 2015, which saw 2,822,708 tonnes of material approved for export across the 12 months. Provided average monthly tonnages for 2016 carry through to December, England looks set to pass the 3 million tonne export mark – achieving an estimated annual figure of around 3.1 million tonnes.

However, the provisional figures also provide further evidence that RDF exports from England are continuing to level out.

In 2014, exports of waste derived fuels shot up to 2.37 million tonnes – more than 750,000 tonnes greater than the amount exported in 2013. But in 2015 the gap began to close, with exports rising by an estimated 450,000 tonnes on the previous year.

A decline in the rate of increase of RDF exports has long been predicted as more opportunities arise on the domestic energy from waste market and incinerators in Europe begin to reach capacity.

The largest recipient of RDF from England during the first 11 months of 2016 was the Netherlands, by a large margin, accepting 1,419,884 tonnes – around half of all material shipped out. This was followed by Germany, which received 620,488 tonnes of RDF, Sweden at 363,349 tonnes and Denmark at 189,818 tonnes.

Industry comments that the growth was mainly from new SRF contracts with RDF demand capping out.

Click [here](#) for more information.

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## **EU decision to lower anti-dumping duty on Argentinian biodiesel proves controversial**

The European Biodiesel Board (EBB) is preparing to launch an anti-subsidy case against Argentinian biodiesel imports, following the recent decision by the European Union to substantially lower anti-dumping duties for the country.

According to a statement, the move comes in response to EBB's growing concerns about the impact the reduction in anti-dumping duties is having on the EU biodiesel market. EBB argues that a fast-track imposition of high level

countervailing duties is necessary to prevent an influx of products from Argentina.

The recently revised anti-dumping duties on Argentinian biodiesel imports range from 43,18 to 79,56 euros/tonne – significantly lower than they were previously. This has led to a massive increase in exports from Argentina to the European markets.

With Argentinian producers able to sell biodiesel at a price lower than the cost of the raw materials in the EU, EBB warns that the EU biodiesel industry and other economic activities connected to the production of the fuel are likely to suffer.

Click [here](#) for more information.

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# Research & Development

## **Scientists convert CO<sub>2</sub> and methane to fuel at room temperature**

Researchers from the University of Liverpool have made a significant breakthrough in the direct conversion of carbon dioxide and methane into liquid fuels and chemicals which could help industry to reduce greenhouse gas emissions whilst producing valuable chemical feedstocks.

In a paper published in chemistry journal *Angewandte Chemie* they report a very unique plasma synthesis process for the direct, one-step activation of carbon dioxide and methane into higher value liquid fuels and chemicals with high selectivity at ambient conditions.

This is the first time this process has been shown, as it is a significant challenge to directly convert these two stable and inert molecules into liquid fuels or chemicals using any single-step conventional (e.g. catalysis) processes bypassing high temperature, energy intensive syngas

production process and high-pressure syngas processing for chemical synthesis.

The one-step room-temperature synthesis of liquid fuels and chemicals from the direct reforming of CO<sub>2</sub> with CH<sub>4</sub> was achieved by using a novel atmospheric-pressure non-thermal plasma reactor with a water electrode and a low energy input.

The highly attractive process could also provide a promising solution to end gas flaring from oil and gas wells through the conversion of flared methane into valuable liquid fuels and chemicals which can be easily stored and transported. Around 3.5% (~150 billion cubic meter gas) of the world's natural-gas supply was wastefully burned, or 'flared', at oil and gas fields, emitted more than 350 million tonnes of CO<sub>2</sub>.

Click [here](#) for more information.

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## Algal bioreactors may result in stronger algal strains for biofuels



*Wikimedia Commons*

One of many improvements necessary for sustainable production of algal biofuel is the development of better algae. Researchers from the Cornell-affiliated Boyce Thompson Institute (BTI) and Texas A&M University have reported in Plant Direct exciting new technology that may revolutionize the search for the perfect algal strain: algal droplet bioreactors on a chip.

A single algal cell is captured in a tiny droplet of water encapsulated by oil, then millions of algal droplets squeeze onto a chip about the size of a coin. Each droplet is a micro-bioreactor, a highly controlled environment in which algal cells can grow and replicate for several days, forming a genetically homogenous colony that goes through its typical biological reactions, including the production of lipids.

Scientists are racing to identify a super algal strain that can reproduce faster and produce more lipid per cell. This summer, ExxonMobil announced the discovery of a strain with a single genetic modification that allows for twice as much lipid production per cell. But this is only a step in the right direction, as thousands of genes hold potential for further improving both traits.

The researchers first validated the chip system with algae known to grow faster or slower, or produce more or less lipid. They then screened 200,000 chemically mutated cells, identifying six mutants with both faster growth and higher lipid content. The screening, done on-chip, uses fluorescence detection of chlorophyll, representing total cell mass, and BODIPY, a fluorescent molecule that binds to lipids. All mutants with potential for improved growth or lipid production were recovered and verified off-chip.

With the discovery and development of much more efficient algal strains, commercial-scale production of biofuel from algae may finally be a realistic promise.

Click [here](#) for more information.

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## BDI develops algae biomass technology for biofuels



*United States Air Force Academy*

BDI-BioEnergy International, known to date for development and construction of BioDiesel plants, is taking the first step into implementation of an in-house developed algae technology – together with 100% daughter company BDI-BioLife Science GmbH.

BDI-BioEnergy International AG will invest roughly € 16M in the construction of an industrial plant for production of algae biomass. The ground-breaking ceremony for the highly automated plant will take place this year at Ökopark Hartberg/Steiermark.

After several years of research, BDI succeeded in bringing an innovative algae production system to industrial maturity. As a first step, BDI-BioLife Science GmbH will produce algae based additives for the food supplement and cosmetic industry.

Following its philosophy of innovative refining of reusable material, BDI succeeded in developing an algae cultivation system, which guarantees a site-independent and constant production of high-quality algae biomass. Based on BDI's wide experience in plant construction, a future-orientated in-door breeding system was developed, which sets technological standards in algae production. Due to the fully closed system, any negative external influences can be eliminated and therefore enable quickest possible growth of the algae.

In the cosmetic and food supplement industry the application of natural ingredients becomes more and more important – the trend is moving towards biological non-hazardous alternatives. BDI-BioLife Science concentrates on the production of natural Astaxanthin. This red colouring agent is recovered from special micro algae and is said to be the "diamond" of radical-scavengers and antioxidants.

The close proximity to the in-house research centre and to local Universities provides synergies for the further development of the algae product range of BDI-BioLife Science.

Click [here](#) for more information.

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## ABBA project to demonstrate potential of wood-based biofuels

Negotiations with the Department of Energy (DOE) were completed and Phase 1 of the "Advanced Biofuels and Bioproducts with AVAP (ABBA)" project has begun. The ABBA project will co-produce full replacement renewable jet fuel, gasoline, diesel and Bioplus® nanocellulose from woody biomass in an integrated biorefinery at AVAPCO's site in Thomaston, Georgia.

The project aims to demonstrate that co-production of high volume commodity fuels and low volume, high value co-products enables profitable biorefineries at commercial scale. ABBA integrates the biorefinery value chain by converting wood to cellulose and cellulosic sugars, which are then converted to cellulosic biojet and nanocellulose. Patented technologies and intellectual property will be provided by AVAPCO, Byogy and Petron. Technology collaborators also include the Renewable Bioproducts Institute at Georgia Tech and the University of Tennessee, Knoxville.

The \$3.7 million Phase 1 DOE award was made under the program "Project Definition for Pilot- and Demonstration-Scale Manufacturing of Biofuels, Bioproducts, and Biopower". Its scope

includes definition engineering, permitting, and financing activities. Upon successful completion of Phase 1, the project is also eligible for a subsequent Phase 2 award of up to \$45 million from the DOE for construction and operation of the project.

AVAPCO's AVAP technology has been demonstrated at the Thomaston Biorefinery since 2012 for co-production of biomass-derived lignocellulosic sugars, cellulosic ethanol, cellulosic butanol, nanocellulose, and lignin. Petron will provide its innovative and proven Ethanol to Ethylene (ETE) conversion technology to demonstrate the conversion of cellulosic ethanol to ethylene. The Byogy "Alcohol to Jet" (ATJ) processing facility, which has been successfully proven under extensive full replacement fuel testing with the US Air Force and the FAA CLEEN program, has also been relocated to the Thomaston site as part of the project to convert the bio-ethylene to full replacement biofuels.

Click [here](#) for more information.

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## **Velocys announces their first US biorefinery**



*Velocys*

Velocys plc (VLS.L), the renewable fuels company, has announced that it has signed a site option agreement with Adams County in the State of Mississippi for its first U.S. biorefinery to be located in Natchez, Mississippi.

The site and local area benefits from an attractive regulatory and tax regime; the availability of an abundant local supply of low cost forestry residue that will form the feedstock of the plant; advantaged transportation infrastructure including barge, rail and road; accessible utilities; land that meets all the required criteria including space and

terrain to support an industrial development; a local workforce skilled in servicing the forestry industry; and a local community with facilities and amenities that will attract additional skilled personnel during construction and ongoing plant operations.

The 100-acre Natchez site was confirmed after the Company analysed a broad set of operational and tax considerations at twelve possible sites in four States in the Southeast United States. Due diligence, including site visits, was completed at each of these sites and incentive offers were received from each State in question.

The analysis lays the foundation for future biorefineries: Velocys is maintaining its list of other advantaged sites in the region, which could host plants with capacities totalling 100 million gallons over the next 10 years. Velocys remains in close contact with the economic development officials in these other States regarding the locations and timing of future renewable fuels facilities.

Click [here](#) for more information.

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## **US researchers seek to improve biofuel yield of switchgrass**

Just as sequencing the human genome has netted major health and medical benefits, switchgrass genomics will pay dividends through the development of advanced liquid biofuels.

Researchers at Michigan State University will use a \$1.1 million U.S. Department of Energy grant to fight disease in switchgrass by identifying regions of the genome that cause disease resistance. Locating these disease-fighting regions will help improve switchgrass' viability. Those thriving switchgrass plants could play a crucial role in the emerging bio-based economy by providing a consistent source of biofuels and diverse bioproducts.

Switchgrass can be found across much of the eastern U.S. However, switchgrass plants have

different traits in the north and the south. Southern switchgrass, for example, do well in heat and can fight off fungal diseases that thrive in warm, wet climates. Northern grasses survive freezing winter temperatures, but they wither when exposed to heat, drought or disease – elements that barely bother their southern cousins.

Breeding programs, ones that take advantage of natural genetic variation in disease resistance, have great potential to improve resistance.

The team will utilize new genetic mapping populations to identify genomic regions responsible for divergence in disease resistance between northern upland and southern lowland switchgrasses. The scientists also will conduct a genome wide association study to identify genes involved in disease resistance. Together these approaches will uncover the causes of disease resistance in switchgrass and provide valuable insights that can be used by breeders to produce more resilient crops.

Click [here](#) for more information.



*Flickr*

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# Bioethanol

## China seeks to reduce corn stocks by producing bioethanol

Biofuels international reports that China's plans to increase the use of bioethanol will not have a significant impact on the grain market, as it would be unrealistic for the country to import large amounts of corn for the industry's development, a government official told Xinhua Net.

China launched corn-to-ethanol pilot programmes in 2004 as part of efforts to cut emissions and advance new energy, and it is the world's third-largest bioethanol producer, using nearly 2.6 million tonnes a year.

Earlier this month, China said it wanted nationwide use of bioethanol gasoline by 2020, and aimed to have an advanced liquid biofuel system and demonstration facility in operation by then, capable of producing 50,000 tonnes of cellulosic ethanol a year.

Years of support for corn farmers has left China with a substantial stockpile of the crop. In 2016, China's corn output stood at around 220 million tonnes, while stocks amounted to 230 million tonnes.

According to government estimates, China's stockpile will suffice to meet demand in the short term, achieving a supply-demand balance in the corn market in three to five years.

For China, the basic principle of developing biofuels is not to pose a threat to food security. To reduce corn stocks, China said it would reduce its corn planting area by around 670,000 hectares and switch to other crops in 2017.

Click [here](#) for more information.

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## Fifth plant approved to use Edeniq's cellulosic ethanol technology

Edeniq, Inc., a leading cellulosic and biorefining technology company announced today that the U.S. Environmental Protection Agency ("EPA") has approved Flint Hills Resources' registration of its 100 million gallons per year Iowa Falls, Iowa ethanol plant for cellulosic ethanol production using Edeniq's technology. Iowa Falls is the fifth existing ethanol plant to receive approval from the EPA for cellulosic ethanol production using Edeniq's Pathway technology. The four existing ethanol plants that have previously received this approval are: Pacific Ethanol's Stockton, CA plant; Flint Hills Resources' Shell Rock, IA plant; Little Sioux Corn Processors' Marcus, IA plant; and, Siouxland Energy Cooperative's plant located in Sioux Center, IA. Edeniq's registered customers now total 500 MGPY of nameplate ethanol capacity and are averaging more than one percent cellulosic ethanol. Customers' cellulosic ethanol yields have increased on average in 2017, and Edeniq expects its technology will continue to advance cellulosic yields for its customers. Significant results are now being shown from process improvements and tuning, yielding ever-increasing production and product diversification. Edeniq's technology remains the lowest-cost solution for producing and measuring cellulosic ethanol from corn kernel fibre utilizing existing fermenters at existing corn ethanol plants, and has already proven cellulosic ethanol yields of up to 2.5% or higher, as a percentage of its customers' total volume output. Once approved by EPA, customers are eligible to qualify cellulosic gallons with D3 RINs, which are considered the most valuable on the RIN market. Additional benefits of Edeniq's technology include increases in corn oil production and greater overall ethanol yields, all provided by a zero-capex cellulosic ethanol production option.

Click [here](#) for more information.

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# Biodiesel

## Aemetis hits commercial scale with Enzymatic Biodiesel



# AEMETIS

*Aemetis*

Aemetis, Inc. announced that its Universal Biofuels subsidiary in India has achieved a major milestone in the commercial production of advanced enzymatic biodiesel by processing one million pounds of low cost waste feedstock unsuitable for use in traditional biodiesel production facilities and achieving high biodiesel yields by utilizing its advanced enzymatic biodiesel process. The production process utilized the first shipment of low cost waste feedstock delivered to the Universal Biofuels plant by BP Singapore (BPS) pursuant to the three-year supply agreement signed by Aemetis and BPS in May 2017.

The 50-million-gallon capacity Universal Biofuels plant, located on the East Coast of India, in Kakinada, Andhra Pradesh, developed the patent-pending advanced enzymatic biodiesel process technology, designed and built the advanced enzymatic biodiesel process reactors, and is now converting low cost waste feedstock into high-quality distilled biodiesel. Production costs are lowered as the pre-treatment conversion process uses less energy and fewer chemicals, such as methanol, than traditional biodiesel production processes. In addition to improved operating costs, the low capital cost of the Aemetis advanced enzymatic biodiesel process allows for widespread and low-cost adoption throughout

the biodiesel industry by converting existing biodiesel plants.

In April 2017, Aemetis filed a patent on the proprietary pre-treatment process used by Universal Biofuels to enable the enzymatic processing of waste oil feedstock to biodiesel. The Aemetis technology solves a primary issue of enzymatic biodiesel production, which is a requirement for the feedstock to maintain a constant optimal temperature, pH and contaminant level that allows for maximum enzymatic activity.

Click [here](#) for more information.

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## Aviation Fuel

### **Qantas announces biofuel-powered flights from 2020**

Qantas has announced its Los Angeles based aircraft will be powered by biofuel from 2020, reducing the airline's carbon emissions on its services operating between the US and Australia.

Over the next ten years, the airline will purchase eight million gallons (30 million litres) of renewable jet fuel each year from US based bio-energy company, SG Preston. The fuel will be used by Qantas' aircraft operating from Los Angeles Airport (LAX) to Australia and follows the Qantas Group's successful domestic biofuel trial flights in 2012.

The fuel consists of 50 percent renewable jet fuel produced from non-food plant oils, blended with 50 percent traditional jet fuel. Compared to standard jet fuel, the biofuel emits half the amount of carbon emissions per gallon over its life cycle.

CEO of Qantas International and Freight, Gareth Evans said the commercial biofuel agreement is the first of its kind in Australian aviation history.

Renewable jet fuel is chemically equivalent to, and meets the same technical, performance and safety standards as conventional jet fuel. SG Preston's biofuel is produced from renewable plant oils, which do not compete with food production and which meet Qantas' stringent sustainability certification requirements

Click [here](#) for more information.

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### **Novel process for jet fuel from eucalyptus**



*Wikimedia Commons*

Biomass Magazine reports that a research team led by Hongfei Lin, associate professor from Washington State University's Gene and Linda Voiland School of Chemical Engineering and Bioengineering, has developed a novel process for synthesizing dense jet fuel from mint, pine, gumweed, eucalyptus or other plants. The research is a significant step towards making high-energy density biofuels affordable in the aviation industry.

The process, known as biphasic tandem catalytic process (biTCP), synthesizes cyclic hydrocarbon compounds for jet fuel from terpenoids, the natural organic chemical compounds found in many plants. Cyclic hydrocarbons are molecular compounds with structures that can store high levels of energy. The researchers were able to create a high yield of the cyclic hydrocarbon p-menthane from eucalyptus oil.

Petroleum-based super dense jet fuels, which can make airplanes fly faster, further and with bigger payloads, are expensive to produce. For instance, Lin says, refining the molecule in JP-10 fuel, exo-tetrahydrodicyclopentadiene, from crude oil is comparable to “processing diamonds from dirt.” Because of their structure, terpenoids are an attractive economic alternative to petroleum fuels.

Collaborating with the University of Nevada-Reno, the researchers’ work was recently published in the journal Green Chemistry.

Click [here](#) for more information.

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## Other Fuels

### **Biogas truck to collect food waste in Bristol**

The Bio-Bee is the UK’s first vehicle to both collect and run on commercial food waste and is operated from GENeco's base in Avonmouth.

With Bristol among 40 places in the UK that consistently exceeds air quality limits for nitrogen dioxide, the Bio-Bee demonstrates a real alternative to diesel RCVs and HGVs by running on clean biomethane.

It also offers a cost-effective and more sustainable way for food waste to be collected and recycled, and it follows in the footsteps of the Bio-Bus – or “poo bus” – which ran on human waste and was trialled in Bristol in 2015.

Boston Tea Party and St Monica Trust care homes are among the first companies to use the service, and it is hoped the Bio-Bee will increase food waste recycling levels in the city.

Every year each person in the UK throws away enough food to power the Bio-Bee for 25 miles.

If Bristol recycled all the food waste generated by the city’s residents in a year the Bio-Bee could run every day until the year 3,000.

Food waste is collected in the Bio-Bee and brought back to GENeco’s anaerobic digestion plant in Bristol. The waste is depackaged – and plastic is removed – and is then used to produce sustainable electricity for homes and communities.

The remaining food waste undergoes a pasteurisation process before being fed into the anaerobic digesters, where micro-organisms break down the waste in the absence of oxygen and produce methane-rich biogas.

This biogas is either used to produce renewable electricity or it is converted in our gas-to-grid plant to enriched biomethane, which is injected into the gas grid. At this stage it can be used as fuel in the Bio-Bee and other vehicles or to supply local homes.

The solid by-product of the anaerobic digestion process is used as a nutrient-rich and sustainable biofertiliser for farms.

Click [here](#) for more information.

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## Events

### **BioBase4SME Training: Communicating Sustainability York, 8th November 2017**

The bioeconomy is a concept many people are still confused by or unaware of. However, consumers are increasingly willing to spend money on products with strong environmental credentials. Bio-based alternatives with a strong sustainability narrative can help to meet growing demand for these solutions.

You are invited to join a training workshop tailored to bioeconomy SMEs on the benefits of sustainability communications and how to develop strategies to boost the marketability of your products.

Click [here](#) for more information.

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## **BBI JU Stakeholder Forum Brussels, 7th December 2017**

The inaugural Stakeholder Forum is a one-day public event dedicated to engaging directly in dialogue with BBI JU's stakeholders. Save the date and make sure you are part of the day. The event will include plenary keynote speeches, high-level discussions with expert panels, thematic breakout sessions, with plenty of networking possibilities.

You can also find out about our work through meeting all 65 of our ongoing projects who will be presenting their work in the permanent exhibition, accessible throughout the event.

The agenda includes opening and closing keynote speeches from champions of the bio-based economy. In the plenary sessions key contributors will present their views on defining the roadmap for a bio-based Europe, the strategic context of the BBI initiative & achievements, lessons learned & sector development and rapporteur feedback.

Click [here](#) for more information.

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## **Bioeconomy Investment Summit Helsinki, 14th-15th December 2017**

Join us on 14-15 December 2017 in Helsinki, Finland for the 2017 Bioeconomy Investment Summit.

New advances in technology mean that everything that can be made out of oil can be made from renewable, biological resources. There are huge environmental and business opportunities for a wide range of industries: construction, chemicals, textiles, energy, plastics.

The bioeconomy gives us a unique opportunity for building a sustainable future. Our speakers will focus on what investment steps we need to take to make it happen.

Click [here](#) for more information.

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## **Eco-Bio 2018 Dublin, 4th-7th March 2018**

ECO-BIO 2018 will highlight the latest research and innovation towards developing industrially viable, safe and ecologically friendly biobased solutions to build a sustainable society.

A topical and comprehensive programme will include plenary and invited speakers, forum discussions, contributed oral presentations, a large poster session and exhibition.

The conference will bring together all concerned with the biobased economy to review industrial, academic, environment and societal approaches, discuss the latest research and progress, and encourage new research partnerships to enable new cascaded biobased value chains.

Click [here](#) for more information.

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## **World Bio Markets Amsterdam, 20th-22nd March 2018**

With governments committed to reducing emissions and consumers becoming more educated about where their products come from, there are opportunities for the bio-based sector to become a true contender to fossil oil. Yet long development times, lack of investment, and challenges in attaining a secure and sustainable supply chain have made it difficult for the bio-economy to achieve commercial success.

This event provides a platform for the entire global value chain, from feedstock producers to consumer brands, to work together to overcome these challenges.

Click [here](#) for more information.

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## **Global Bioeconomy Summit 2018 Berlin, 19th-20th April 2018**

The first Global Bioeconomy Summit was held in 2015 and brought together more than 700 bioeconomy stakeholders from over 80 countries. Since then, Bioeconomy has taken a steep and exciting way forward. Many notable initiatives and collaborative efforts have been initiated by the bioeconomy community in order to drive the development of sustainable bioeconomies in their countries and regions.

It is now time to come together again and to re-visit the strategies for future international cooperation in a next Global Bioeconomy Summit!

The 2nd GBS will focus on emerging concepts and future trends in bioeconomy, the latest on challenges and opportunities related to ecosystems, climate action and sustainable development along with the bioeconomy innovation agendas and global governance initiatives to manage them.

We hope you will consider participating and join us at the GBS2018 in Berlin.

Click [here](#) for more information.

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## **EUBCE Copenhagen, 14th-18th May 2018**

We look forward to the 26th EUBCE in 2018 in Denmark and to the many vibrant topics that will be included in the agenda. The core of the traditional EUBCE conference will be held over 4 days.

There will however be an extension to the core conference and exhibition in order to showcase the many achievements in the field of full scale biomass utilisation in Denmark that are an integral and major part of the country becoming fossil-free by 2050. Members of the national organising committee will organise special technical visits to sites in the centre of the country where biomass is

the key renewable feedstock into processes producing renewable energy, biofuels, biochemicals and biomaterials as well as integrating bioproducts into traditional established fossil-based systems.

Click [here](#) for more information.

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## **RRB 14 Ghent, 30th May - 1st June 2018**

The 14th edition of the International Conference on Renewable Resources & Biorefineries will take place in Ghent, Belgium from Wednesday 30 May until Friday 1 June 2018. Based on the previous RRB conferences, this conference is expected to welcome about 350 international participants from over 30 countries.

Delegates from university, industry, governmental and non-governmental organizations and venture capital providers will present their views on industrial biotechnology, sustainable (green) chemistry and agricultural policy related to the use of renewable raw materials for non-food applications and energy supply. The conference further aims at providing an overview of the scientific, technical, economic, environmental and social issues of renewable resources and biorefineries in order to give an impetus to the biobased economy and to present new developments in this area.

The conference will provide a forum for leading political, corporate, academic and financial people to discuss recent developments and set up collaborations.

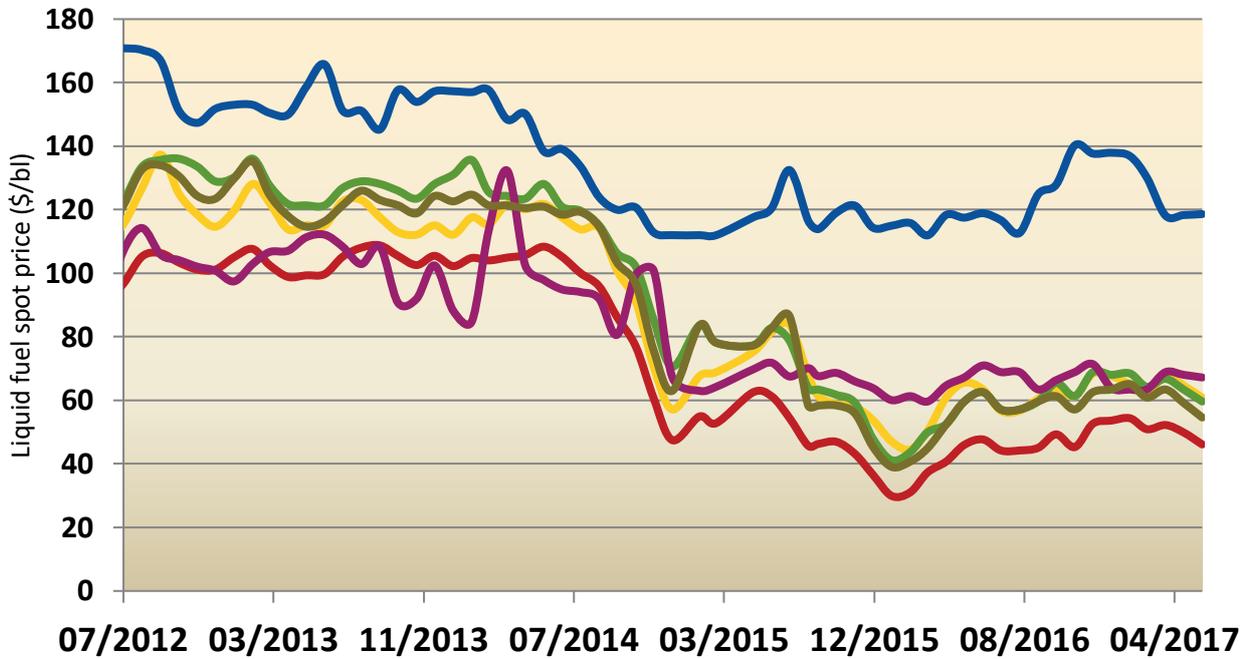
The three-day international conference will consist of plenary lectures, oral presentations, poster sessions and an exhibition. Companies and research organizations are offered the opportunity to organize a satellite symposium.

Click [here](#) for more information.

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# Price Information

Historical spot prices of liquid fossil fuels and liquid biofuels. Five years prices and up to June 2017 are given in \$ per barrel.



- Crude Oil (petroleum), simple average of three spot price
- Gulf Coast Gasoline
- Diesel - New York Harbor Ultra-Low Sulfur No 2 Diesel Spot Price
- Ethanol Average Rack Prices F.O.B. Omaha, Nebraska
- Jet Fuel Spot Price FOB - U.S. Gulf Coast Kerosene
- FAME 0° FOB ARA

Prices of Crude oil, diesel, gasoline, and jet fuel are recorded from [www.indexmundi.com](http://www.indexmundi.com); Price of ethanol from [www.neo.ne.gov](http://www.neo.ne.gov); Biodiesel spot prices from <http://www.kingsman.com>

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**NNFCC**

**Biocentre, York Science Park**

**Innovation Way**

**Heslington, York**

**YO10 5DG**

**Phone: +44 (0)1904 435182**

**Fax: +44 (0)1904 435345**

**Email: [enquiries@nnfcc.co.uk](mailto:enquiries@nnfcc.co.uk)**

**Web: [www.nnfcc.co.uk](http://www.nnfcc.co.uk)**

**Twitter: [@NNFCC](https://twitter.com/NNFCC)**